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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.     | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------|------------------|
| 09/775,920  | 02/02/2001  | James J. Alwan       | 100.718.419 (MIC- 77US) | 8909             |
| 7590 09/02/2005   |             |                      | EXAMINER                |                  |
| RAJESH VALLABH, ESQ.<br>HALE & DORR, LLP<br>60 STATE STREET<br>BOSTON, MA 02109 |             |                      | MACCHIAROLO, PETER J    |                  |
|   |             |                      | ART UNIT                | PAPER NUMBER     |
|   |             |                      | 2879                    |                  |

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

09/775,920

Applicant(s)

ALWAN, JAMES J.

Examiner

Peter J. Macchiarolo

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 July 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-26 and 33-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-26 and 33-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application on 07/22/2005. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/22/2005 has been entered. However, pending claims 13-26, and 33-45 are not allowable as explained below. An action on the RCE follows.

### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: mutually moving an etchant dispenser and cathode assembly during the applying.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 13-26, and 33-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.**

4. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Nowhere in the original disclosure does Applicant disclose the etchant dispenser and the cathode assembly are *mutually* moved. Since no special definition is given to “mutually moved,” the Examiner is giving the broadest reasonable interpretation, i.e. that both are moved at the same speed in the same direction or reciprocal directions. The instant specification does not support this limitation. The Examiner notes that the second full paragraph on page 8 of the specification recites that only one of the etchant dispenser and cathode assembly are moved, while the other is stationary. This is not an example of mutually moved elements.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**5. Claims 13-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant’s admitted prior art in view of previously cited Sandhu et al (USPN 5271798; “Sandhu”) in further view of previously cited Potter (USPN 5700176; “Potter”).**

6. Regarding claims 13-21, 24, and 39 Applicant admits the prior art includes a method of forming an FED comprising providing a substrate having a central area and a peripheral area, forming alignment marks and bond pads on the peripheral area of the substrate, forming an

emitter electrode structure on the central area of the substrate, forming a plurality of micropoints in groups on the emitter electrode structure, depositing an insulating layer over the substrate, emitter electrode structure, and plurality of micropoints, and depositing a conductive layer over the insulating layer. Applicant further admits it is known that selectively etching openings through the conductive and insulating layers comprises applying a layer of photoresist on said conductive layer, imaging said photoresist to define a pattern for said openings, developing the photoresist, and etching the pattern for the openings. The Examiner further notes that the prosecution history has shown this to be a well known method of manufacture.

7. Applicant further admits a method of making a semiconductor wafer to clear alignment marks by locally applying a wet etchant to uncover a structure is known in the art to effectively clear the marks without the use of photolithography<sup>1</sup> (see also Sandhu).

8. Neither Sandhu nor Applicant's admitted prior art discloses mutually moving an etchant dispenser and the cathode assembly during the applying, or that the semiconductor manufacturing method comprising selectively spraying a wet etchant on a structure can be used for FED fabrication.

9. However, Sandhu does disclose the etchant dispenser (21) is moved relative to the cathode assembly, and it would have been obvious to one of ordinary skill to mutually move the etchant dispenser and the cathode assembly to minimize the space and time required for manufacturing the device.

10. Furthermore, Potter teaches a process for producing field emission devices are generally more attractive alternatives to semiconductor devices for many applications, being capable of

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<sup>1</sup> Instant spec., page 4, para. 2.

Art Unit: 2879

high performance and being capable of fabrication from a wide range of materials with less stringent controls of material purity, but with fabrication processes and equipment similar to those used for semiconductor fabrication.<sup>2</sup> Further, Potter shows in figure 1, a cathode (100) and an anode (70) assembly assembled together in a FED, which can be automatically aligned, or aligned according to the well-known prior art method i.e. with alignment marks. Potter further teaches contact pads are selectively provided at the device top surface to make electrical contact, which may require the same clearing method as described in Sandhu.

11. Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an FED with the method admitted by Applicant and Sandhu to allow for less pure materials and cheaper manufacturing method.

12. Regarding claims 22, and 23, Applicant admits the prior art includes a method of forming a cathode assembly of a field emission device comprising polishing the conductive layer via chemical-mechanical planarization. The Examiner further notes that the prosecution history has shown this to be a well known method of manufacture.

13. Regarding claims 25 and 26, the limitations herein have been discussed at rejected claims 13 and 16 above and will not be repeated here. The reasons for combining and motivation are the same as for claim 13.

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<sup>2</sup> Potter, abstract, and col. 23-29.

Art Unit: 2879

14. Regarding claims 33, 34, 37, 38, and 42-45 Sandhu discloses the etchant dispenser is moved relative to the cathode assembly, and the cathode assembly is moved relative to the etchant dispenser.

15. Regarding claim 35, 40, Sandhu shows applying the etchant on the bond pads in elongated spray zones (shown generally at fig. 4, #12).

16. Regarding claims 36, and 41, Sandhu shows applying an etchant from a nozzle in the etchant dispenser while moving the nozzle over the cathode assembly, but is silent to moving it linearly.

17. However, this is an obvious modification if the bond pads are in a linear configuration, as in an FED.

18. The motivation and reasons for combining are the same as for claim 13.

#### ***Response to Arguments***

19. Applicant's arguments filed 07/22/2005 have been fully considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (571) 272-2375.

The examiner can normally be reached on 8:30 - 5:00, M-F.


Art Unit: 2879

21. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571) 272-2475. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

22. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



P. M.



**JOSEPH WILLIAMS**  
**PRIMARY EXAMINER**